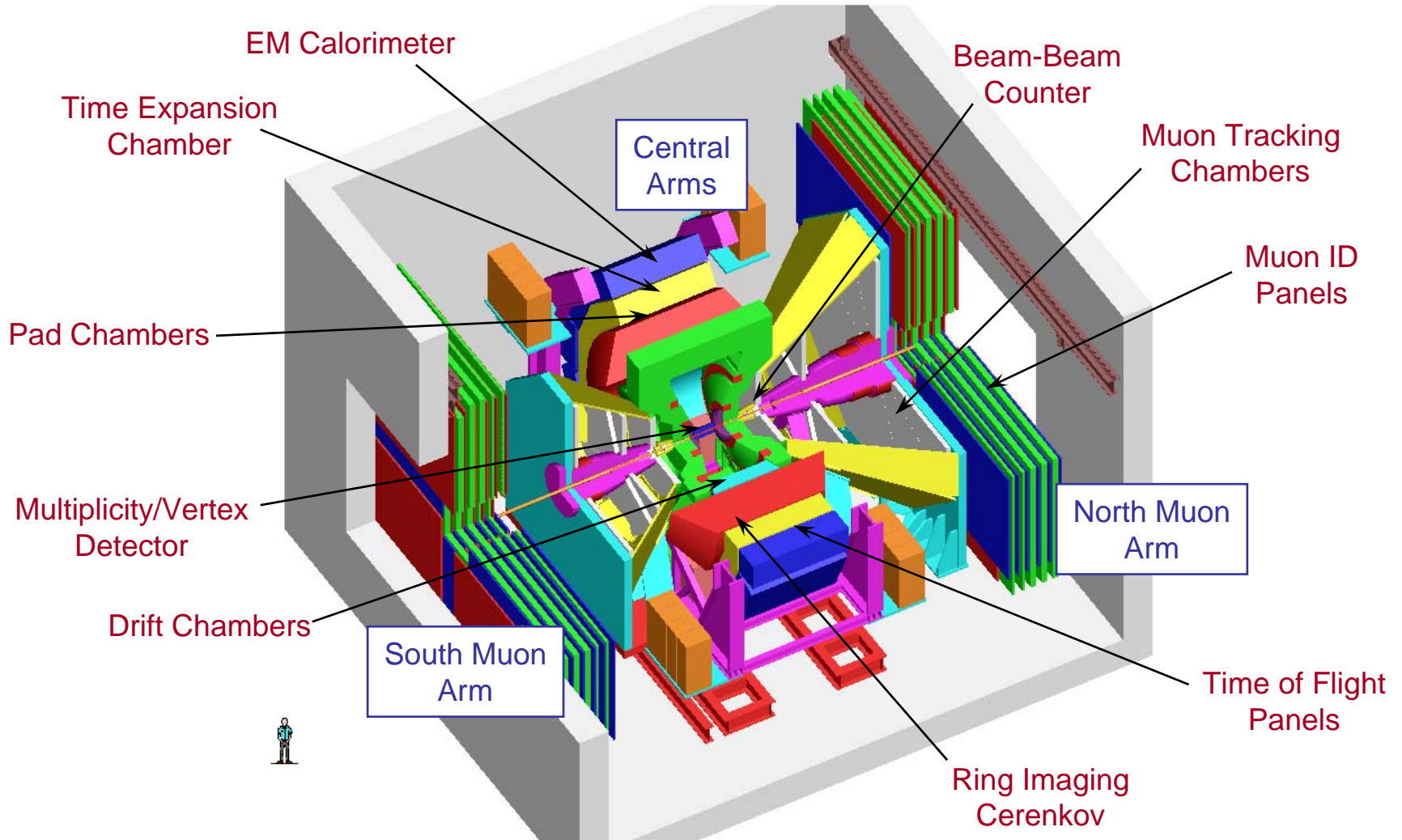


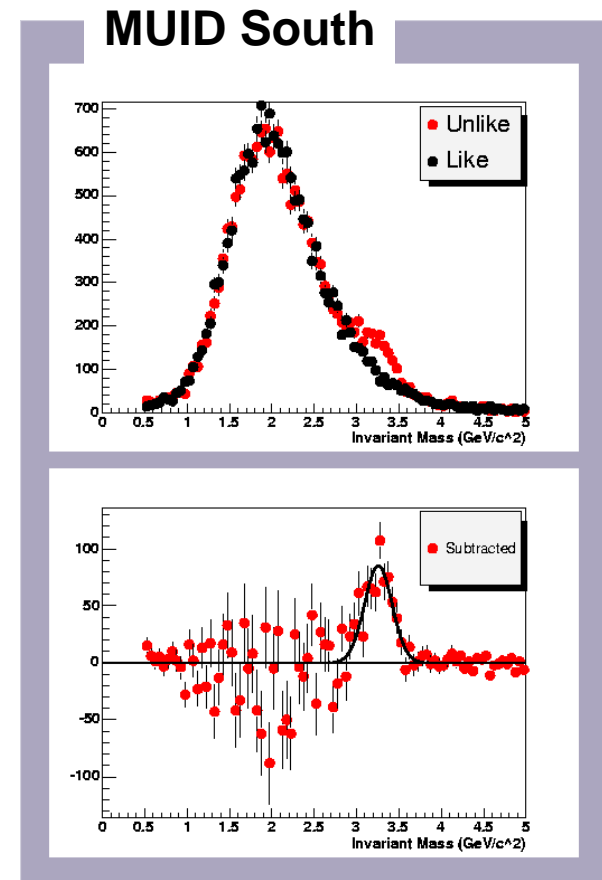
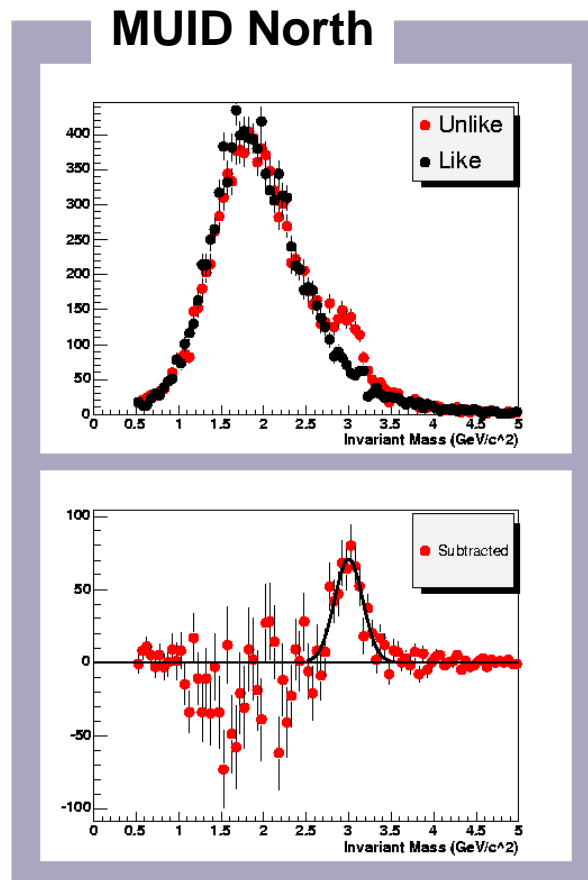
# The PHENIX Detector



# $J/\Psi \rightarrow \mu^+\mu^-$ in CuCu 200 GeV

- $J/\Psi$  clearly seen in LVL2 filtered events:

Results  
obtained in  
semi-real time!  
(less than 2  
days from data  
to go through  
LVL2,  
calibration, and  
production).

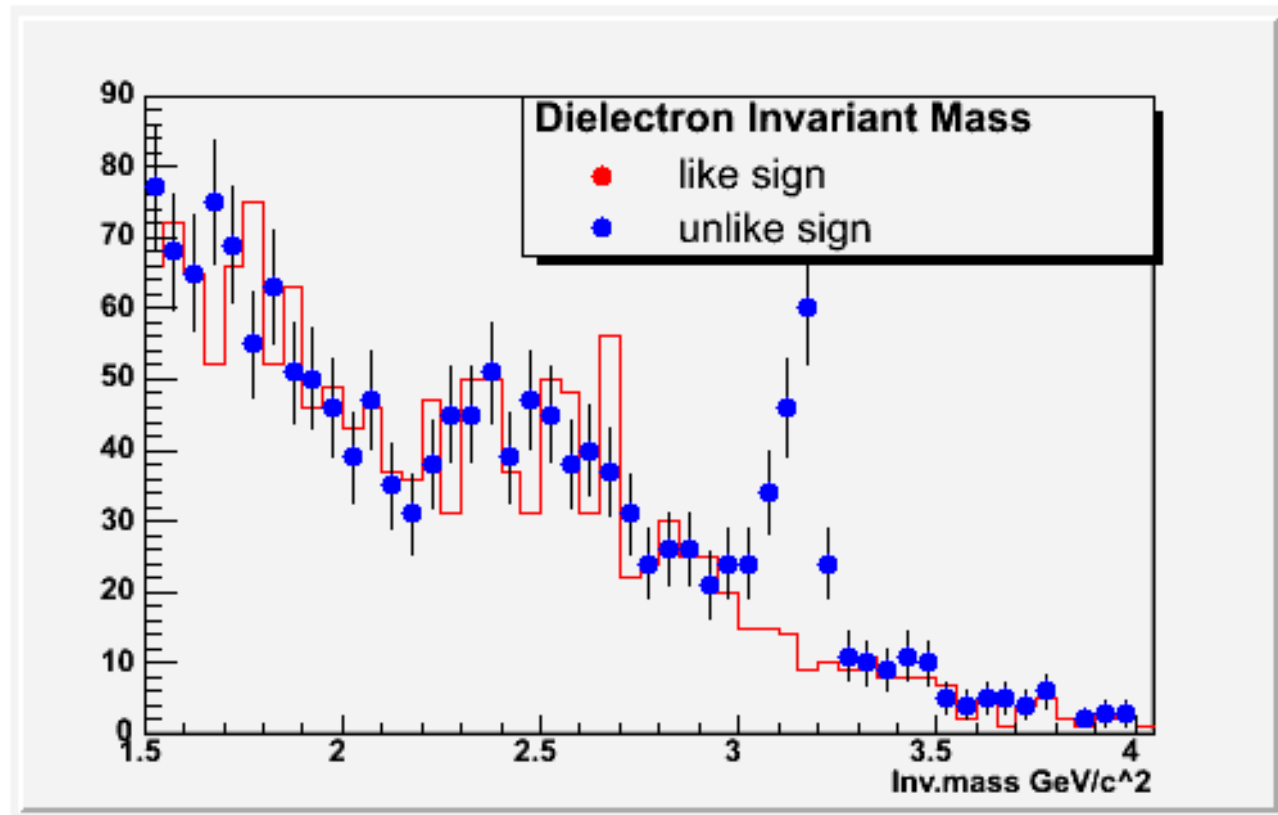


( $\sim 300 \mu\text{b}^{-1}$  processed through LVL2 and reconstruction,  $\sim 400 J/\Psi$  per arm)

# $J/\Psi \rightarrow e^+e^-$ in CuCu 200 GeV

- $J/\Psi$  also seen in central arm data:

Results  
obtained in  
semi-real time!  
(less than 2  
days from data  
to go through  
LVL2,  
calibration, and  
production).

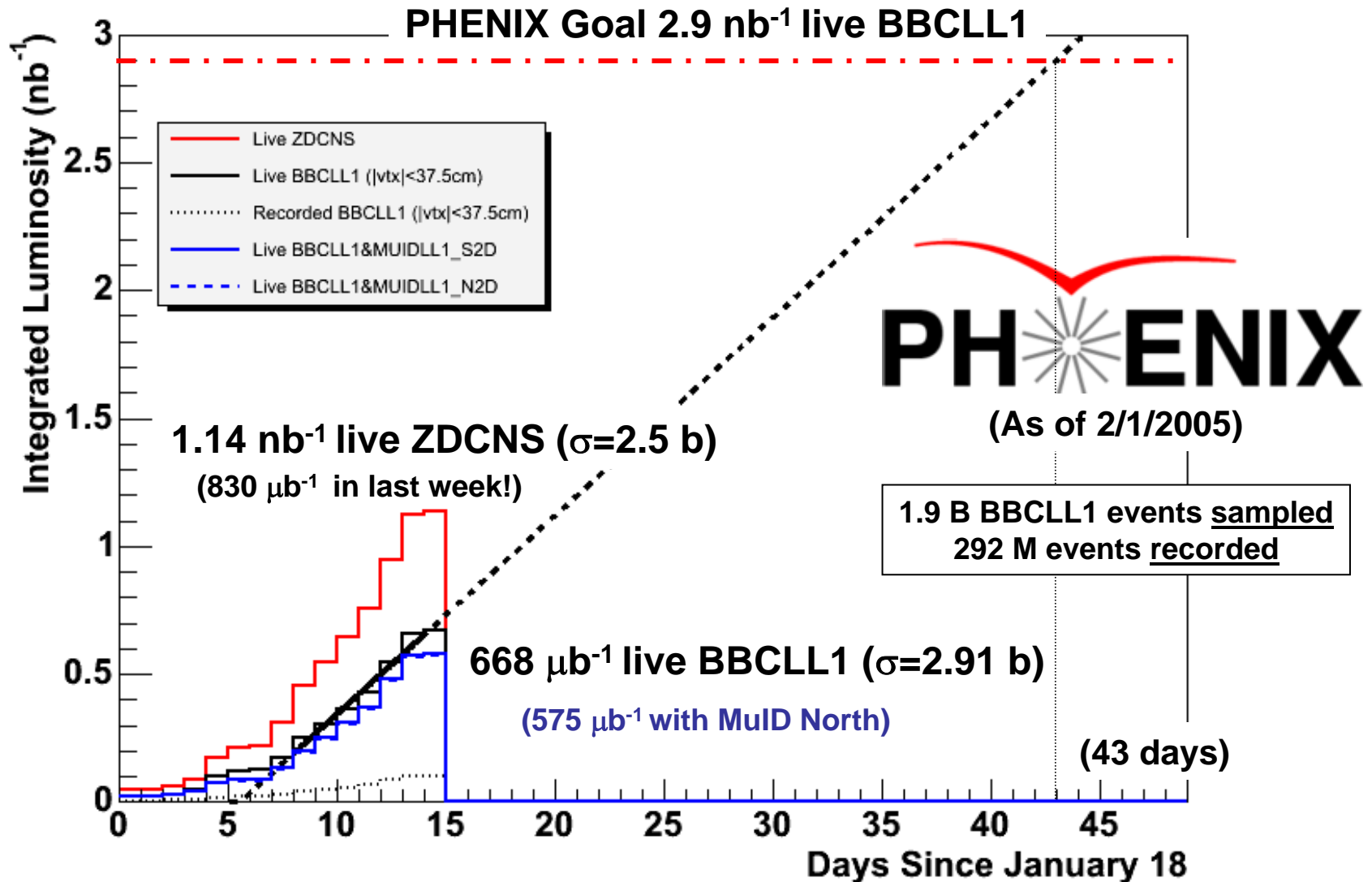


(~350  $\mu\text{b}^{-1}$  processed through LVL2 and reconstruction, ~130 events in peak)

# You say tomato...

- The PHENIX request in the beam use proposal (BUP) was for  $7\text{nb}^{-1}$  delivered luminosity.
  - “Delivered” means luminosity useable by the experiment
  - BUP assumes 0.7 for vertex cut, 0.6 for PHENIX duty cycle
  - This gives the PHENIX goal of  $2.9\text{ nb}^{-1}$ .
- The PHENIX minimum bias trigger is the BBC LL1.
  - Sees ~90% of the CuCu inelastic cross section
    - $(3.228\text{ barns} \times 0.9 = 2.91\text{ barns})$
  - We believe the ZDC sees ~90% of the BBC LL1 cross section
    - $(2.91\text{ barns} \times 0.9 = 2.62\text{ barns})$
  - Use CAD nominal value of 2.5 barns when we report ZDCNS luminosity
  - We report “live” luminosity (seen by DAQ)

# 200GeV CuCu Integrated Luminosity



# Converting to RHIC Delivered

- We need two numbers to convert RHIC delivered to PHENIX sampled:
  - The 1.14 nb<sup>-1</sup> of ZDCNS corresponds to 0.668 nb<sup>-1</sup> BBC LL1
    - Conversion factor 0.59 (**approx. the PHENIX vertex cut**)
  - Since Jan 18<sup>th</sup>, RHIC delivered ~2.8 nb<sup>-1</sup> ZDCNS while PHENIX sampled 1.14 nb<sup>-1</sup>
    - Conversion factor 0.41 (**This is NOT the PHENIX duty cycle!**)
- So, 2.9 nb<sup>-1</sup> of PHENIX BBC LL1 corresponds to a “RHIC delivered” number of:

$$2.9 \text{ nb}^{-1} \times \frac{1}{0.41 \times 0.59} = 12.0 \text{ nb}^{-1} + 2 \text{ nb}^{-1} = 14 \text{ nb}^{-1}$$

(Jan. 11<sup>th</sup> offset)

# What PHENIX Needs...

- While current projections look promising, we need to work to get an additional “safety factor” to insure we reach our goals:
  - Suggest that weekday day-shift machine development continue through Feb 11<sup>th</sup>
    - Focus on increasing luminosity w/o “dramatic” changes
      - bunch intensity
      - 37x37 to 40x40, maybe higher?
      - PHENIX rare triggers good to ~90kHz ZDC rate
  - From Feb. 14<sup>th</sup> through the end of the run the focus shifts to reproducibility of stores and duty cycle
    - Machine development two day shifts per week/ as needed
  - The above suggestions serve two purposes
    - Maximize the probability of reaching our goals even with “disasters”
    - Keep the machine tuned for optimal performance

# 62 GeV CuCu?

- PHENIX is very interested in a low-energy CuCu run, provided:
  - PHENIX has reached the 200 GeV goal of  $2.9\text{nb}^{-1}$ .
    - Currently projected ~50 days after Jan 11<sup>th</sup> physics start (March 2<sup>nd</sup>)
  - There is sufficient time allocated to integrate a comparable “pp equivalent” luminosity:

$$\int Ldt \Big|_{pp \text{ equivalent}} = A \times B \int Ldt \Big|_{A+B}$$

- AuAu pp equivalent luminosity at 62 GeV was  $0.36 \text{ pb}^{-1}$
- Assuming current CuCu 200 GeV luminosity ( $\sim 415 \text{ } \mu\text{b}/\text{week}$ ):
  - Drop a factor of ~10 for lower energy
  - “pp equivalent” =  $63 \times 63 \times 41.5 = 0.165 \text{ pb}^{-1} / \text{week}$
  - Need two weeks of running plus three days setup time



# BACKUP

# Optimal Store Length

